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NWFSC

5.0 Survival in Rivers in the Columbia River Basin

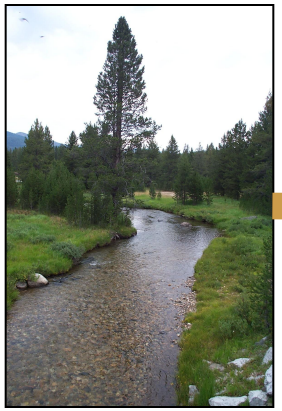
Rich Zabel

May 6, 2015

Passive Integrated Transponder (PIT) Tags

- Keep track of individuals with unique codes
- Remain with individual for lifetime

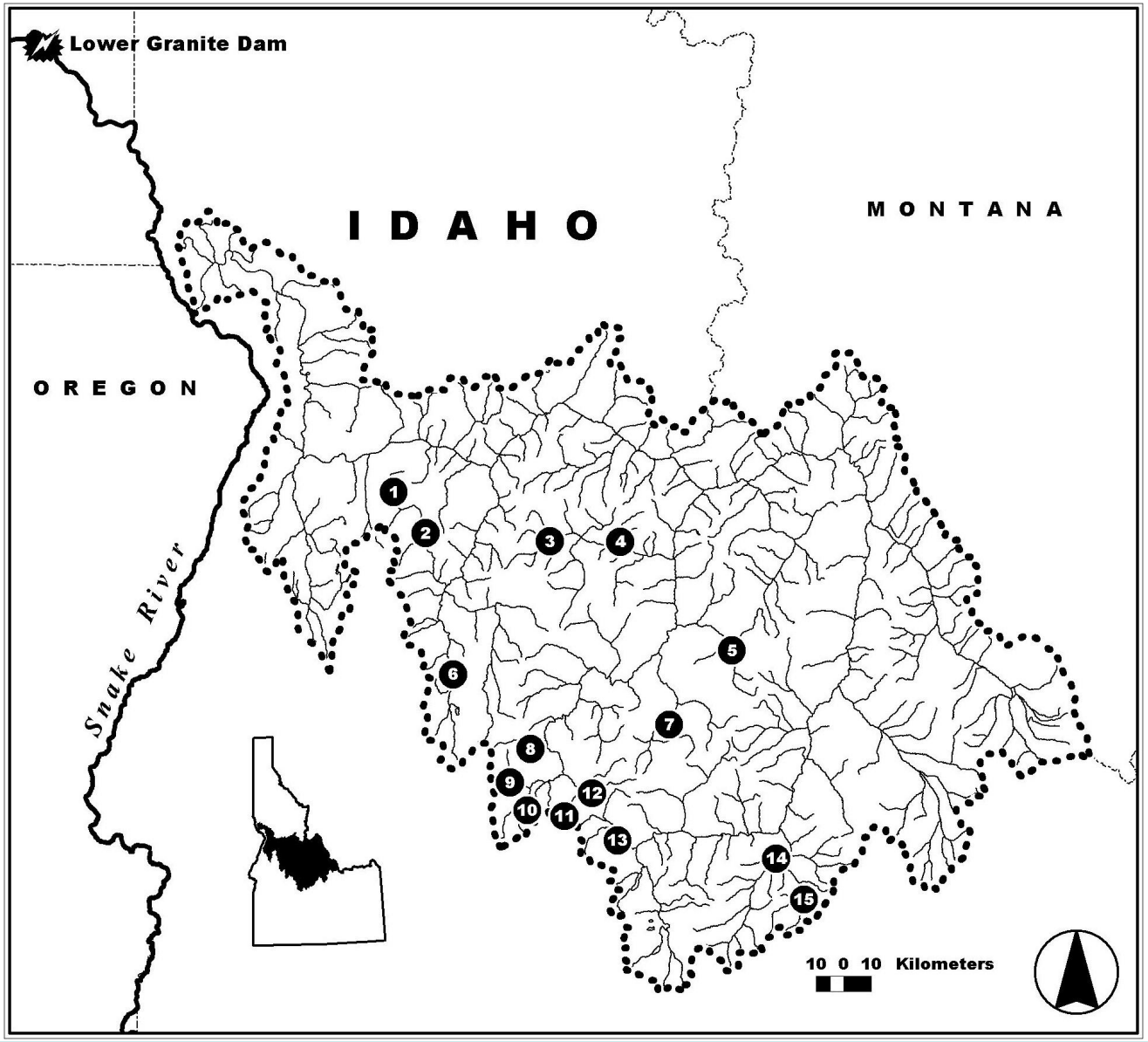
Estimating Parr-to-Smolt Survival



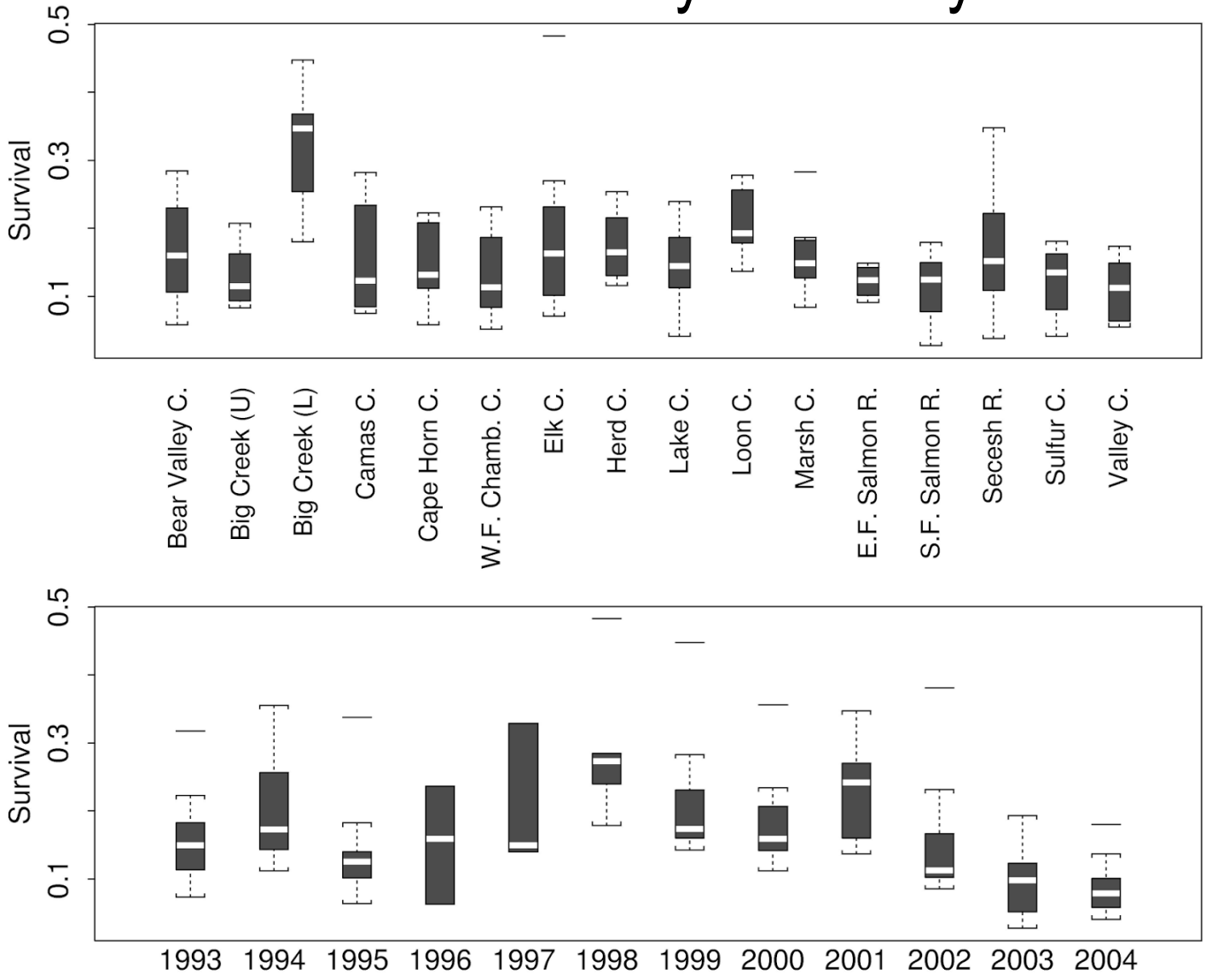
Freshwater
Spawing/Rearing
Stream

Lower Granite
Dam on the
Snake River

Study Sites in the Salmon River Basin, Idaho



Survival varies by site and year



Zabel and Achord. 2004. Ecology

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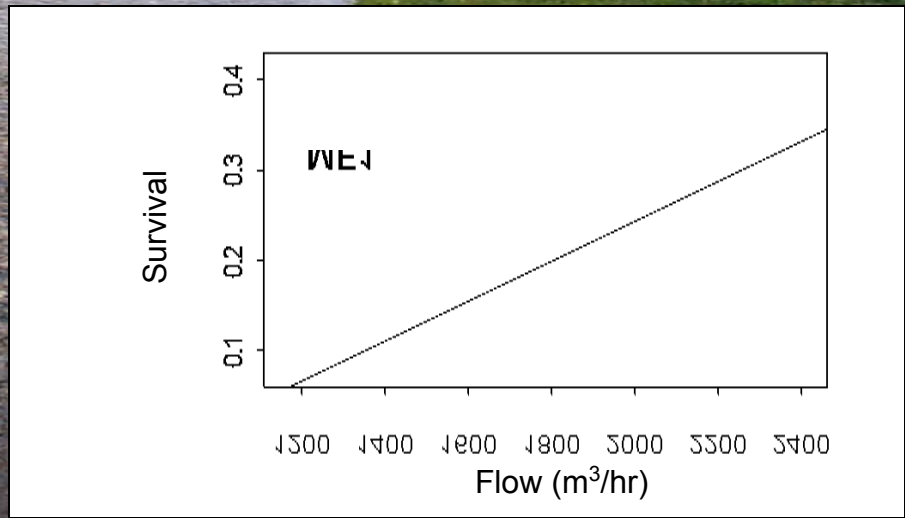
Levin, Achord, Feist & Zabel. 2002. Proc. Roy. Soc. London B.

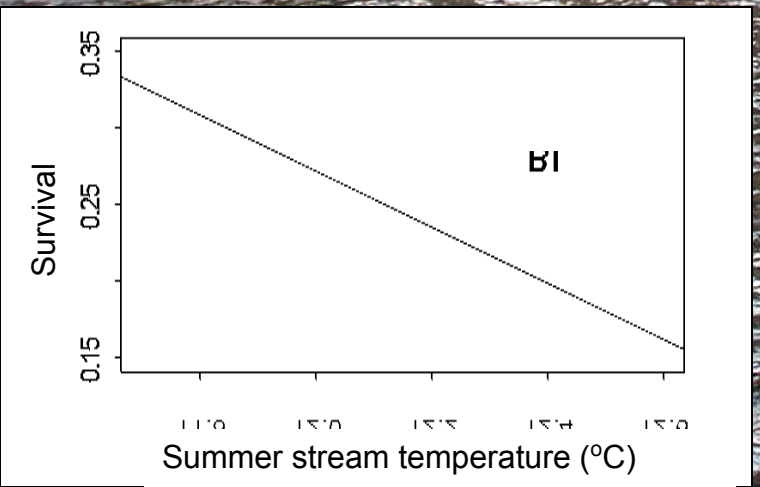
CAPE HORN CREEK

C2

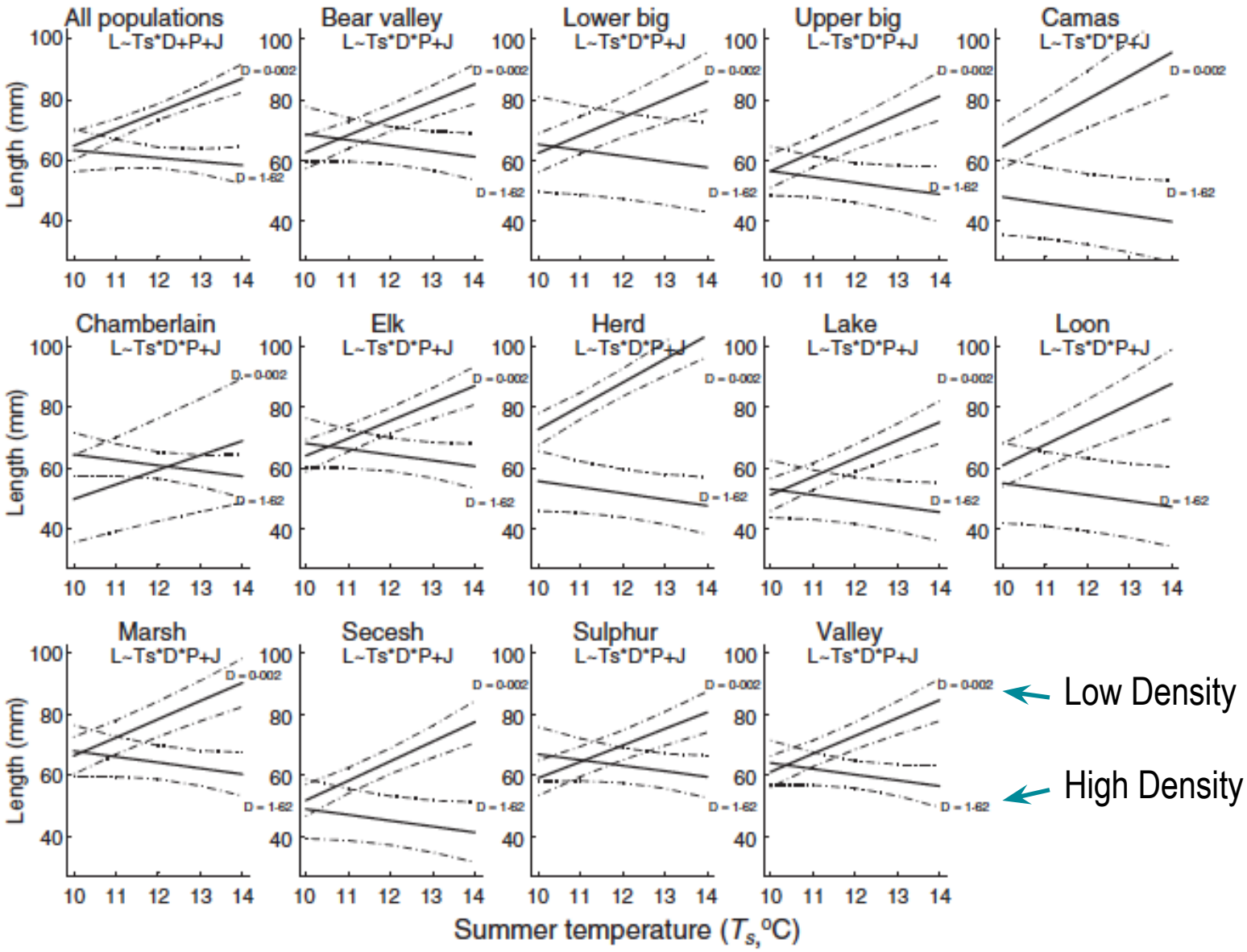


Crozier and Zabel. 2006. J of Animal Ecology.

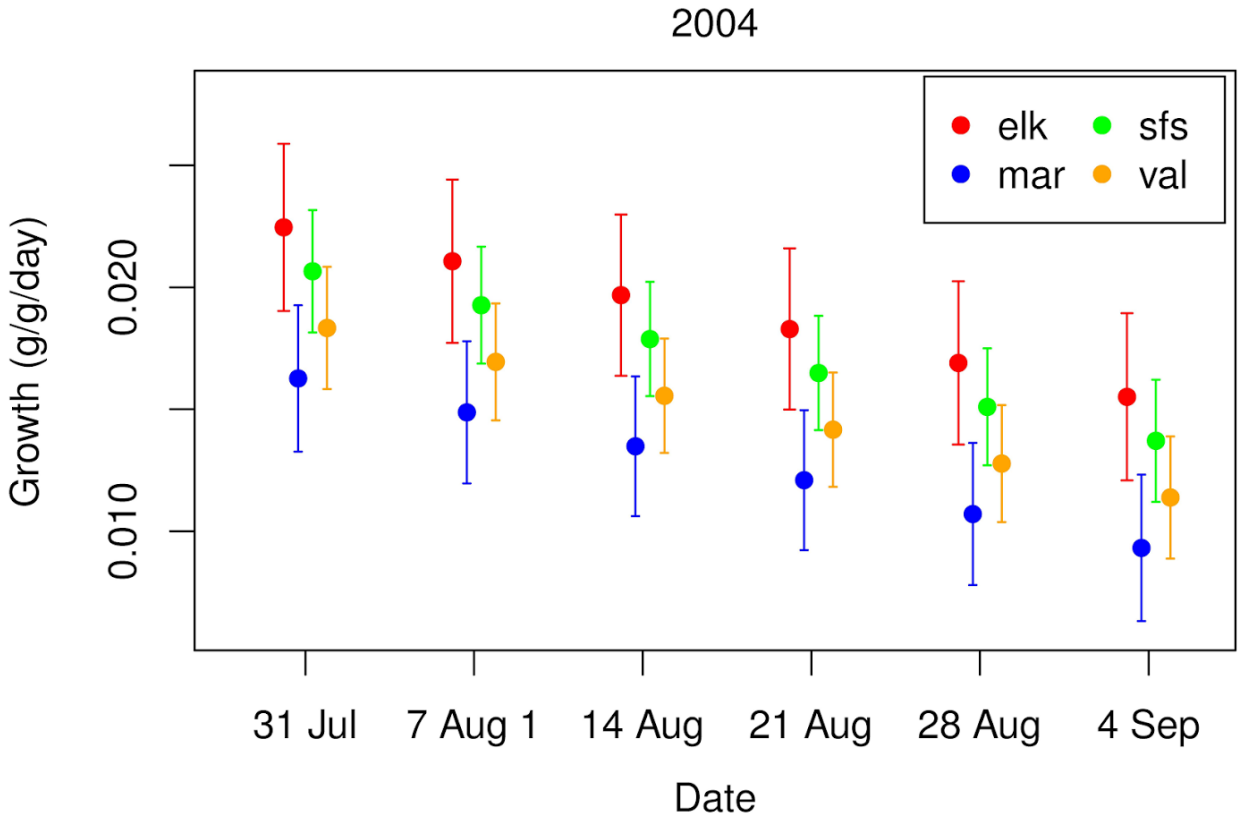
BIG CREEK (LOWER)



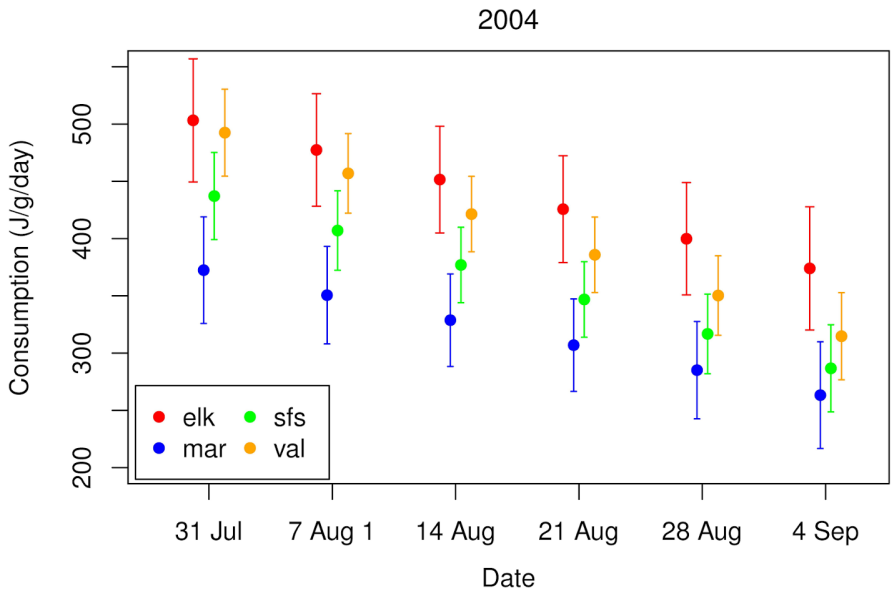
Crozier and Zabel. 2006. J of Animal Ecology.

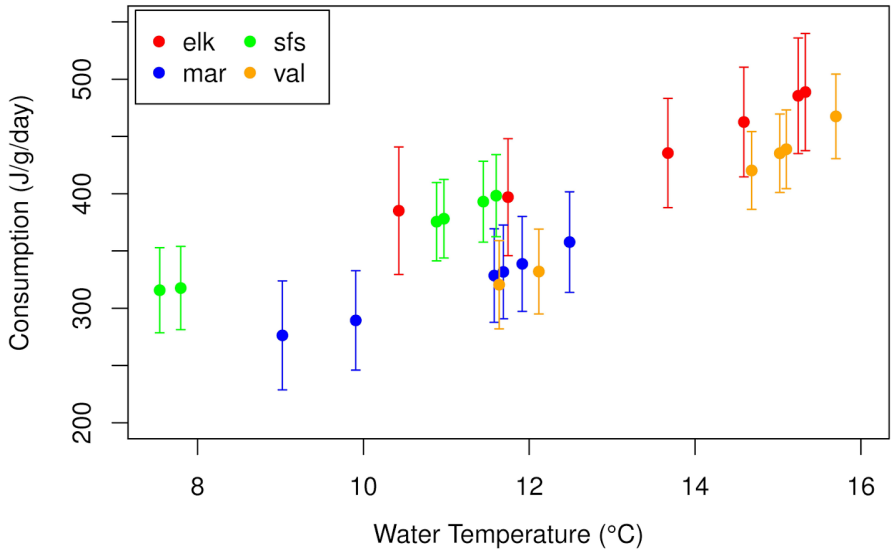


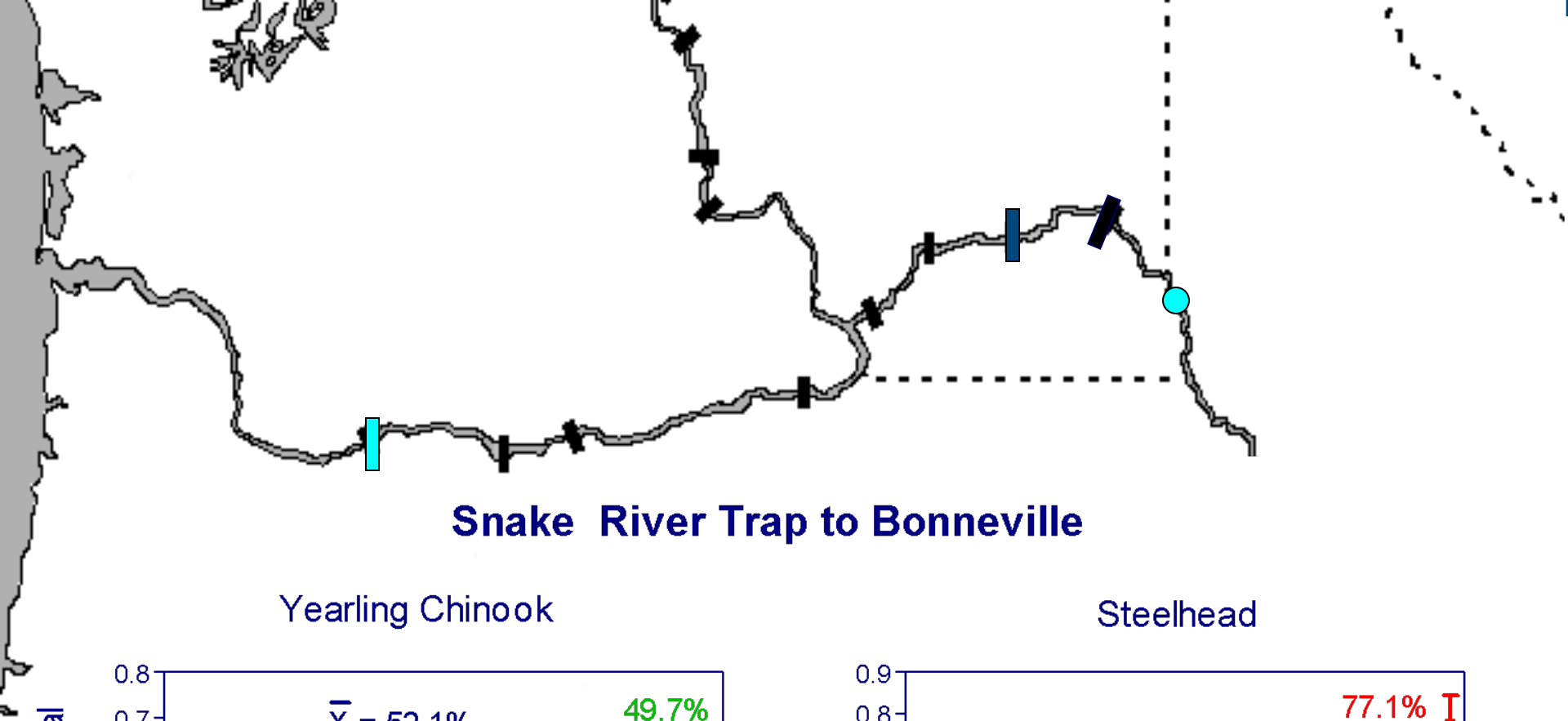
Crozier et al. 2009. J. Animal Ecology



Chittaro, et al. 2014. Env Biol of Fish

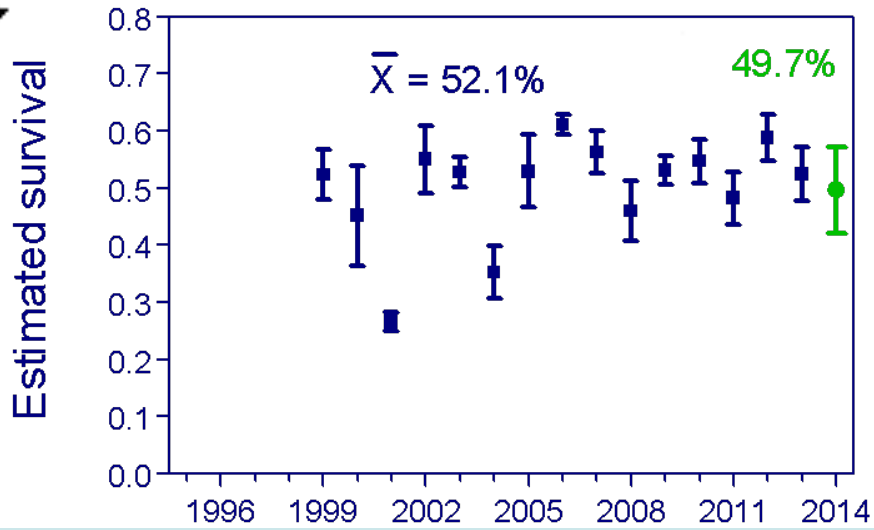

2004
Consumption (J/g/day)
200
300
400
500
elk
sfs
mar
val
31 Jul
7 Aug 1
14 Aug
21 Aug
28 Aug
4 Sep
Date


Consumption (J/g/day)
200
300
400
500
elk
sfs
mar
val
8
10
12
14
16
Water Temperature (°C)

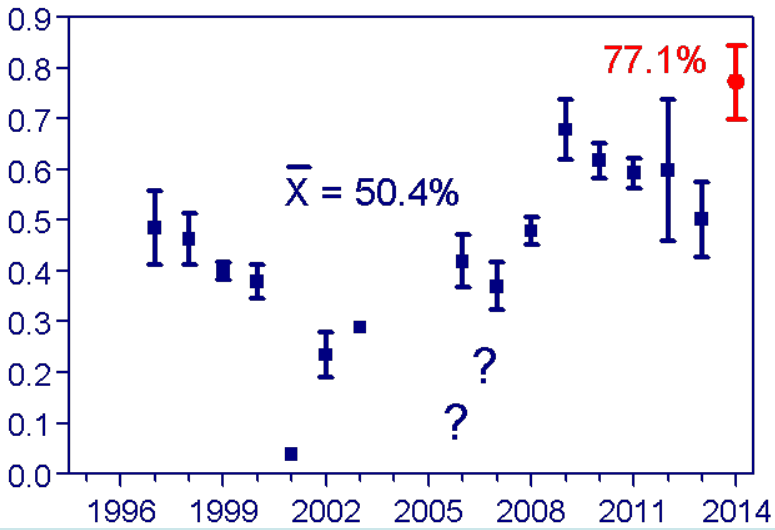


Snake River Trap to Bonneville

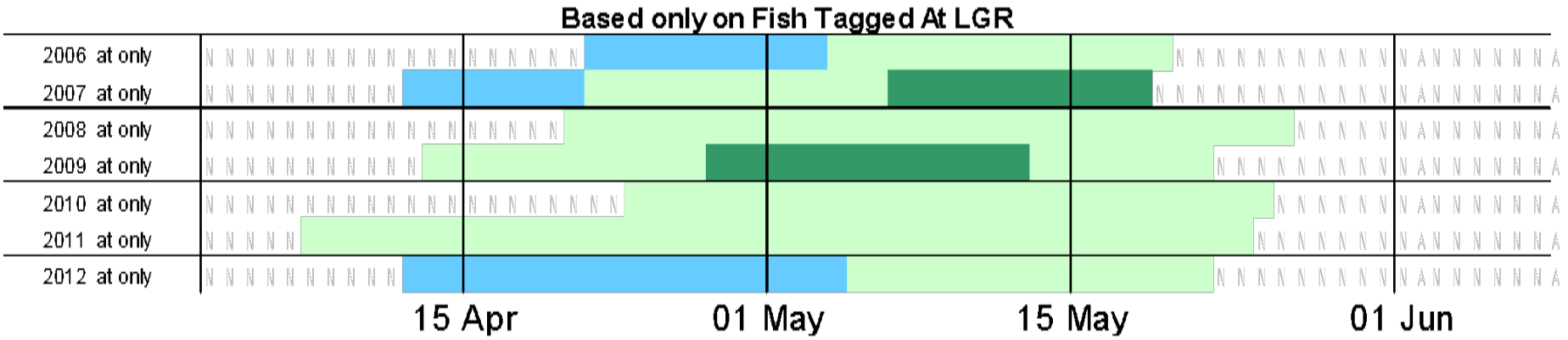
Yearling Chinook



Steelhead

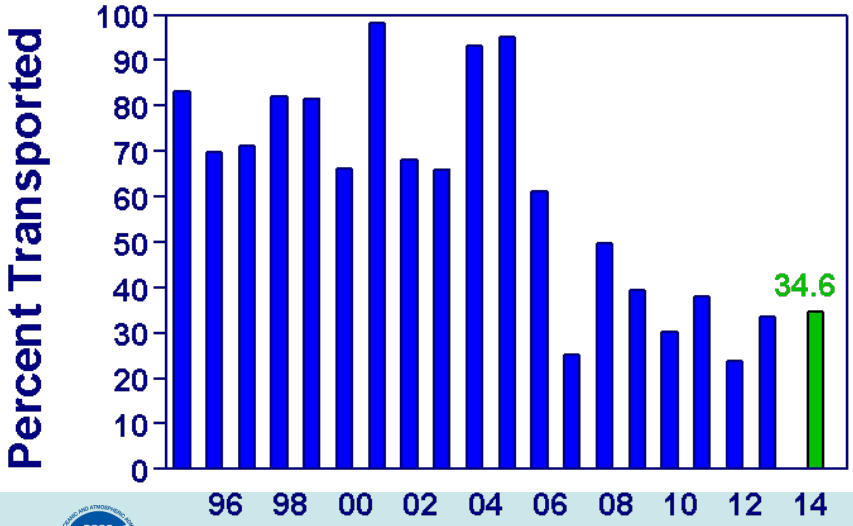


Benefits of Transportation

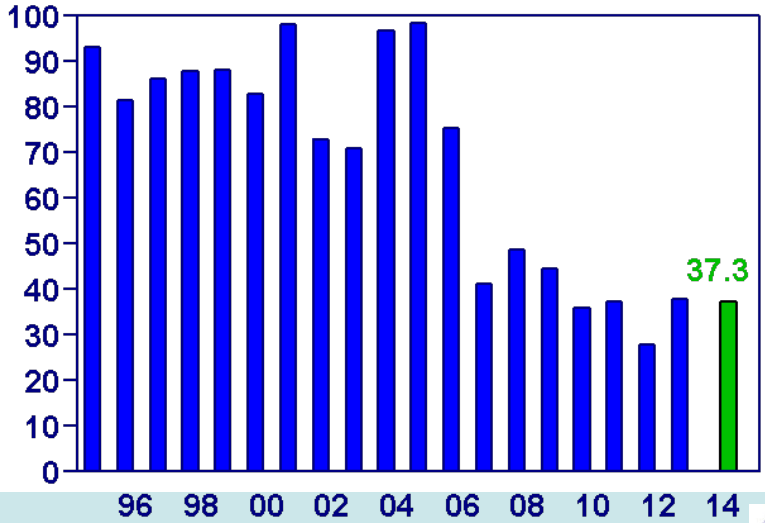


Percent Transported to Below Bonneville

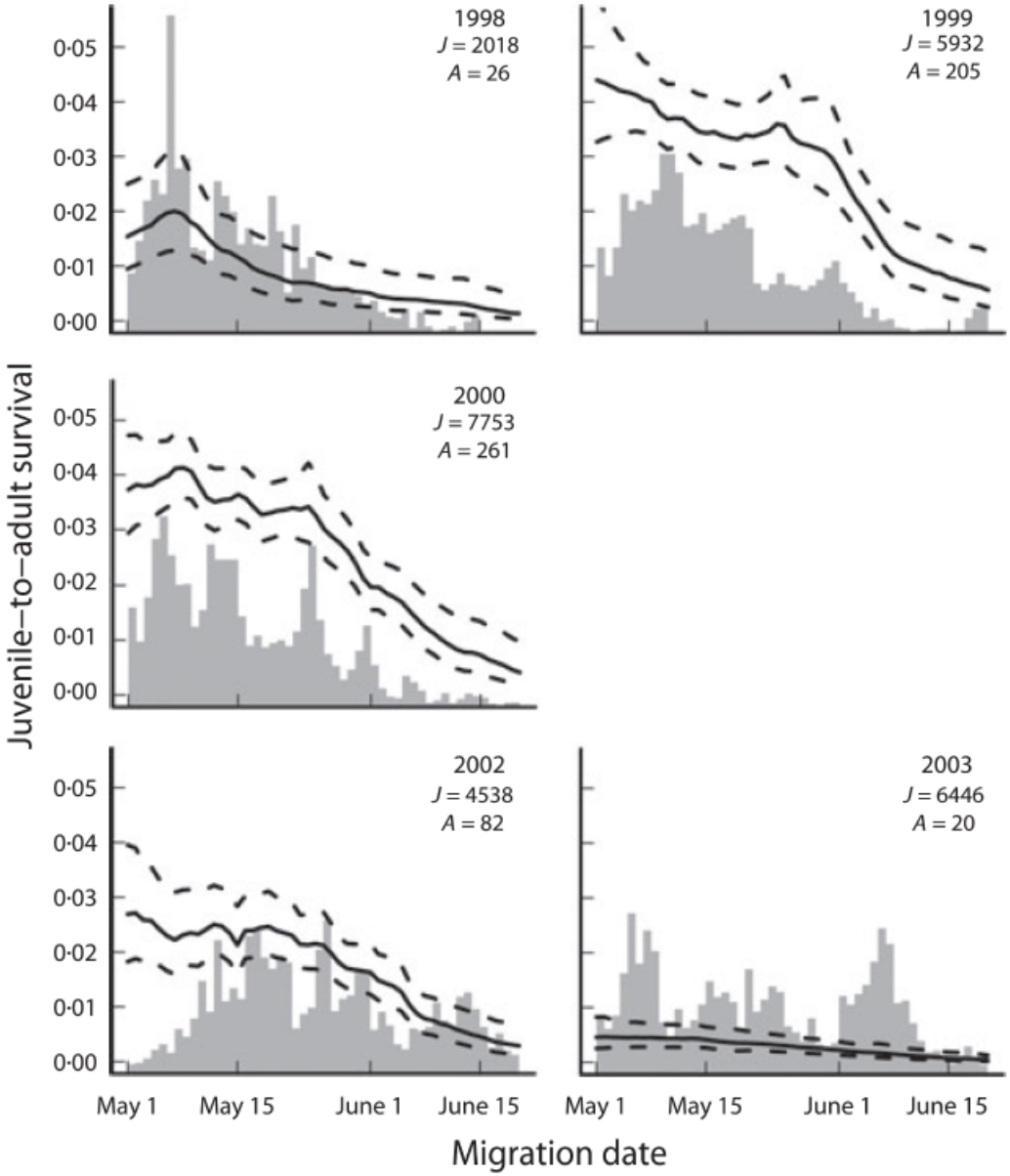
Yearling Chinook



Steelhead



Snake River spring/summer Chinook salmon



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Scheuerell, et al. 2009. J. Applied Ecology

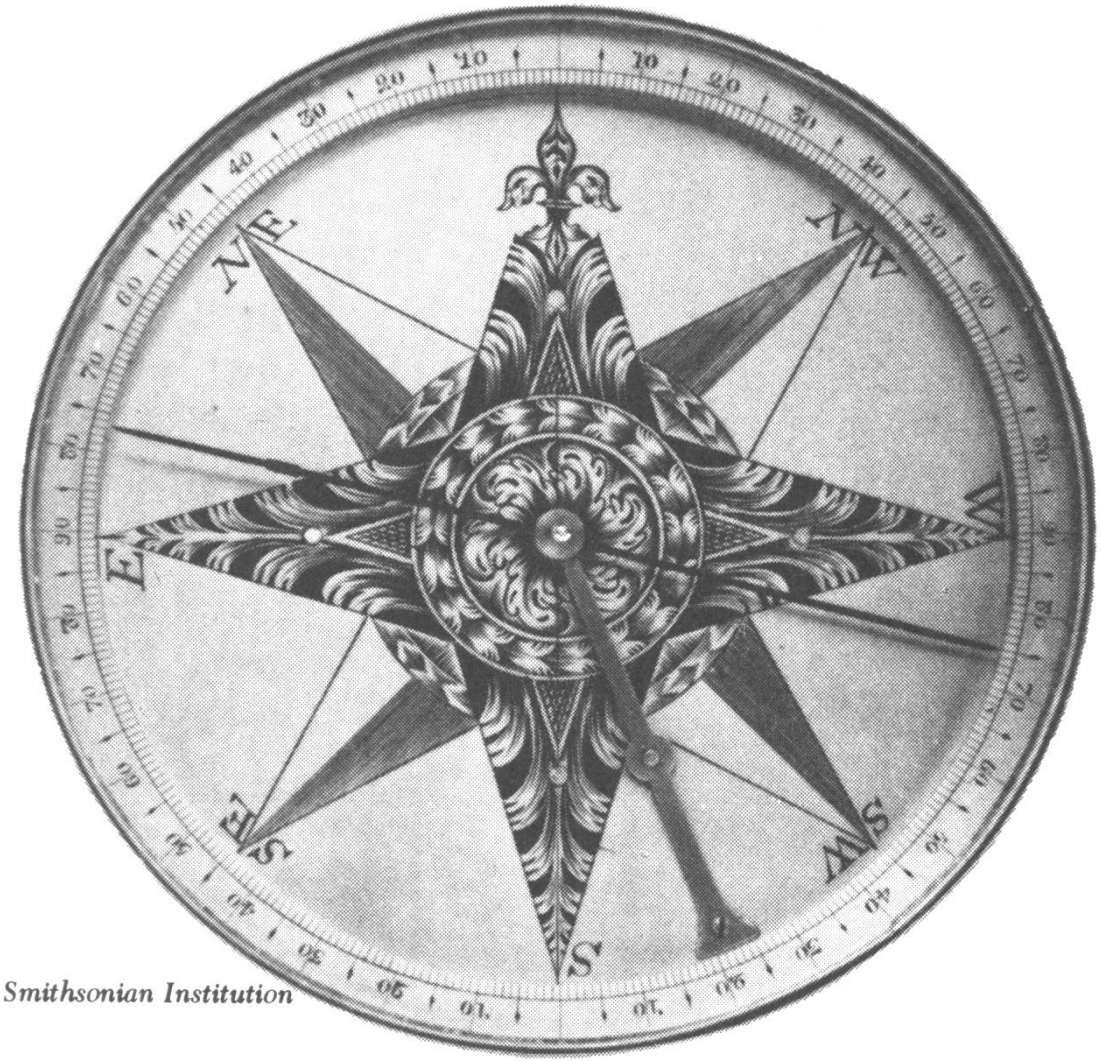
February 2015: ~1,500 California Sea Lions at Astoria's East Mooring Basin

Survival varied by tagging date

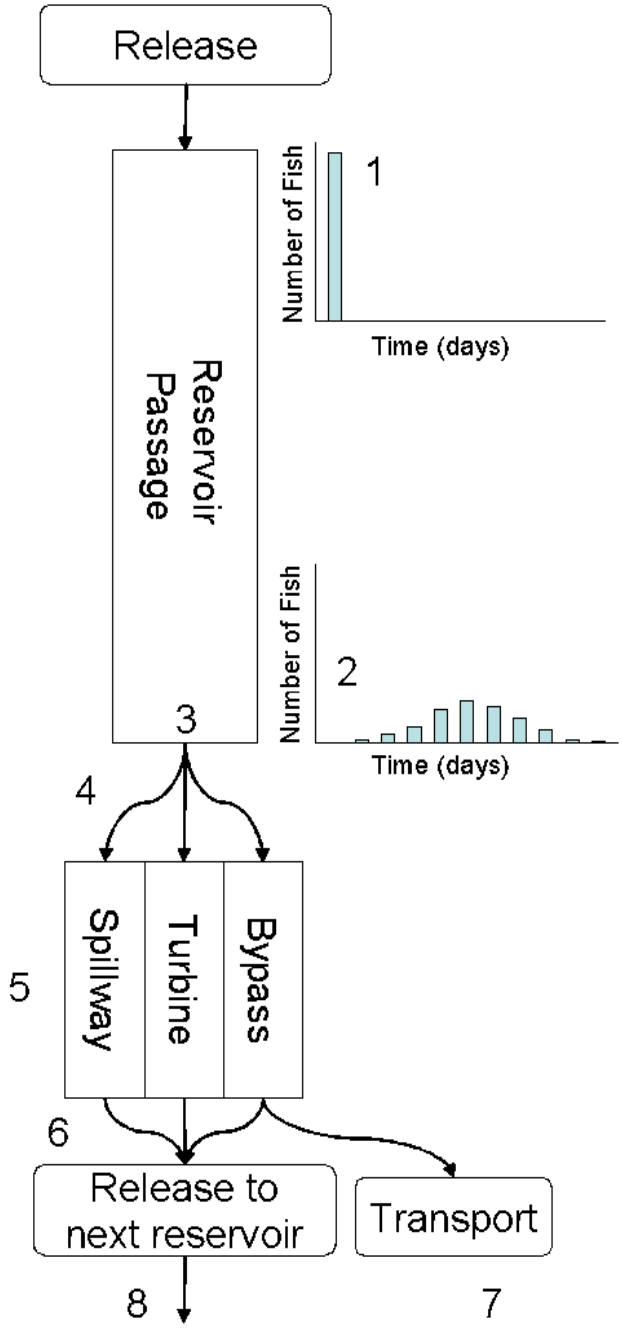
	Adjusted Survival		
Year	Early Season (3/20-4/7)	Middle Season (4/9-5/2)	Late Season (5/3-6/20)
2010	NA	89%	101%
2011	89%	81%	101%
2012	74%	82%	91%
2013	NA	62%	104%
2014	*40%	*63%	*107%

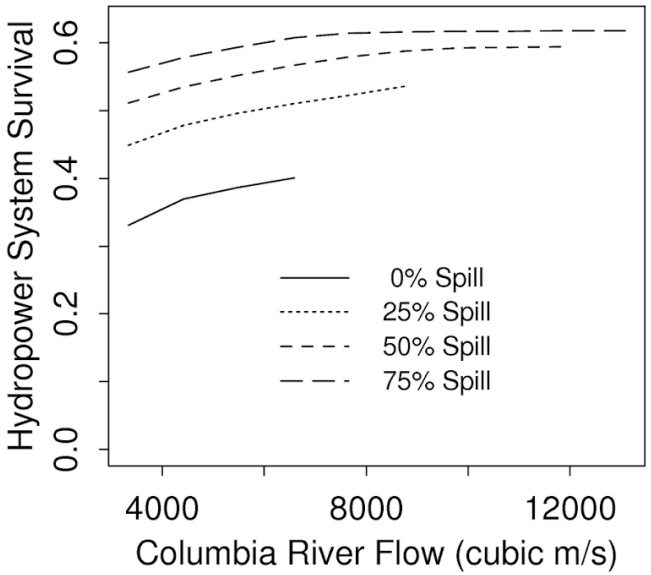
*Preliminary estimate; assumes harvest of 4%

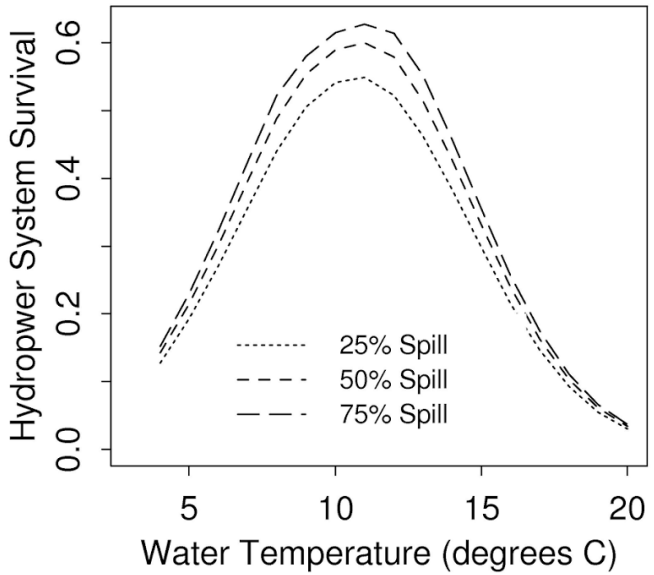
Comprehensive Passage (COMPASS) Model



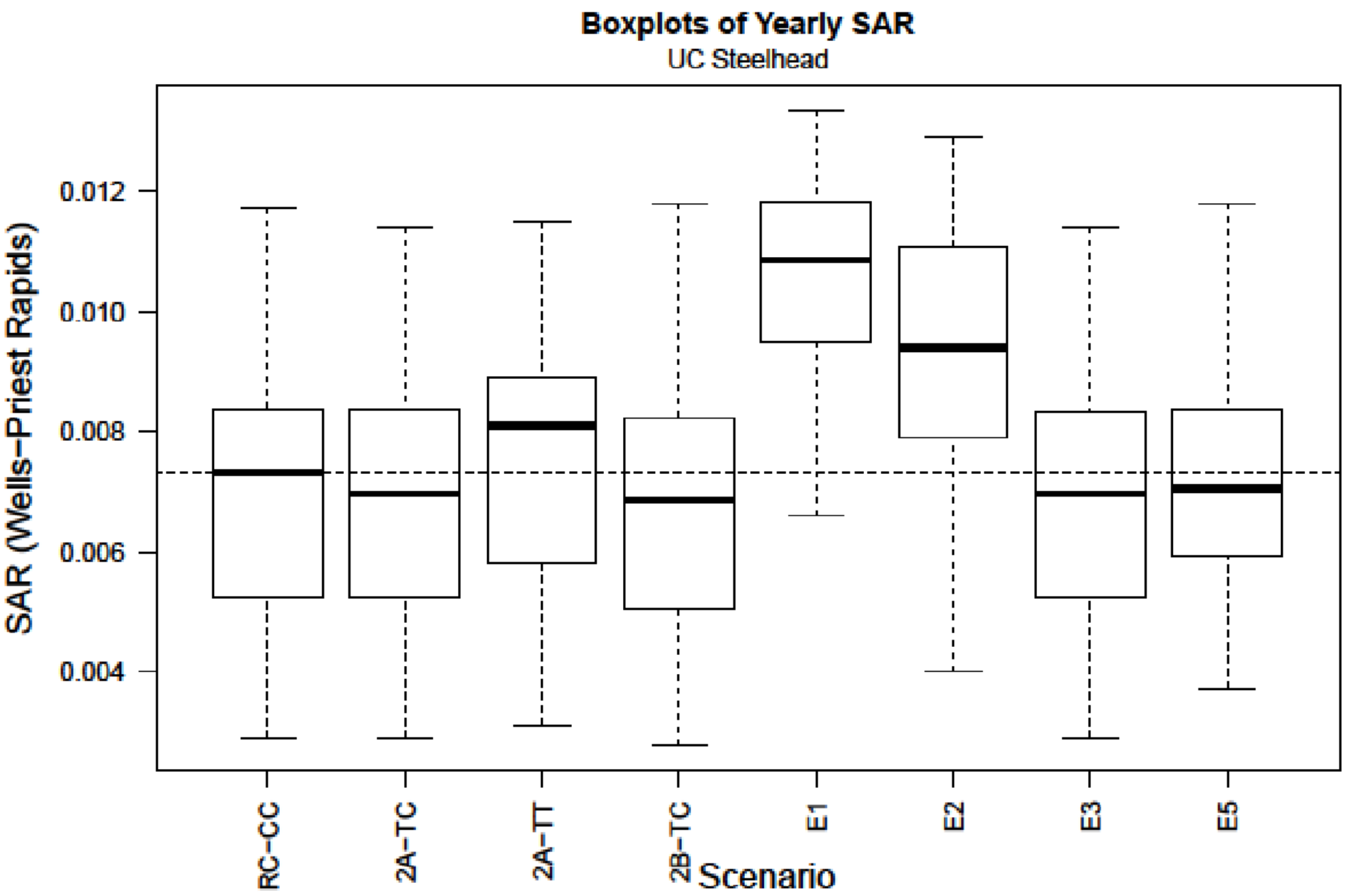
Smithsonian Institution


Release
Reservoir Passage
Number of Fish
1
Time (days)
Number of Fish
2
Time (days)
3
4
Spillway
Turbine
Bypass
5
6
Release to next reservoir
Transport
8
7





Model Results: spring/summer Chinook survival through the hydropower system responsive to water temperature and spill levels. Not as responsive to flow levels


Boxplots of Yearly SAR
UC Steelhead
SAR (Wells–Priest Rapids)
0.012
0.010
0.008
0.006
0.004
RC–CC
2A–TC
2A–TT
2B–TC
E1
E2
E3
E5
Scenario


THANKS!